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AQUATIC WARBLER ON MIGRATION OBTAINED ON TUSKAR ROCK: WITH SPECIAL REFERENCE TO THE PLUMAGE MARKINGS AS COMPARED WITH THOSE OF THE SEDGE-WARBLER.

By Professor C. J. Patten, M.A., M.D., Sc.D.

(Plate I.)

In the November number of the 'Irish Naturalist,' 1913, p. 220, I published a short preliminary note stating that I had received and identified an Aquatic Warbler (*Acrocephalus aquaticus*) from the Tuskar Light-station, Co. Wexford. The bird was picked up dead on the rock at 4.45 a.m. on Saturday, August 9th, 1913, by Mr. Glanville, principal keeper. At the outset I must acknowledge my great indebtedness to him for so promptly forwarding me this interesting specimen in the flesh on the very morning that he obtained it. I received it on Tuesday, August 12th, at Inishtrahull Island Light-station, the parcel having just caught the weekly post-boat returning from Malin Head to the island. I was delighted to find that the bird was in an excellent state of preservation for skinning and dissecting. It had been dipped in spirit * before being posted, a wise procedure on the part of Mr. Glanville. For the epidermis was thereby toughened and prevented from peeling, a mishap well known by the taxidermist to occur in some cases within twenty-four hours if the weather

* Immersing a specimen in spirit for a few hours or even less before posting it is a good practice in warm weather. Fat birds, as this one was, are improved by this treatment.

be warm. I found no difficulty in making a first-class skin of the bird, which, with other avian rarities collected by me, will, in due course, be presented to the National Museum, Dublin.

An examination of the body afforded evidence that the bird was quite fresh when picked up, and was more than likely killed by striking the lantern during the previous hours of darkness. From the nature of the wounds, involving not only severe lesions of the skull and brain, but also fracture of the sternum and intra-thoracic hæmmorrhage, death was evidently instantaneous, and the bird, immediately on striking the lantern, no doubt fell over the balcony down on to the rock. A tract of feathers, extending along the left cheek and left side of the neck, was knocked out, indicating that the bird did not collide of necessity head on, but much more likely was carried sideways or obliquely against some part of the lantern.*

The condition of the body was very good, the muscles were well developed, and much fat was present. The specimen weighed three drams, thirteen grains, being proportionately as heavy as were any well-nourished Sedge-Warblers which I have obtained on their regular migrations past the Tuskar Light-station.

From the foregoing facts it is obvious that we cannot place this bird in the category of a waif which had been perambulating about on the rock in a half-starved condition for some days before death overtook it and rid it of its miseries.† In other words, it was not a bird which, becoming separated from its companions, drifted about aimlessly until, fatigued or storm-bound,‡ it sought refuge on a rock. The bird seems to have

* By the term lantern I include all the parts besides the glass, *e. g.* hand-rails, ladder, dome, balcony-rails, &c. On the different ways birds strike the lantern, see my papers on "Grasshopper-Warblers on Migration" ('Irish Naturalist,' August, 1912, p. 140); "Spotted Flycatchers on Migration" (*ibid.* p. 197); "Diurnal Migrations" ('Zoologist,' 1913, pp. 217, 218, 219).

† On the other hand, an Icterine Warbler which I have recently obtained from the Tuskar Rock comes under this category.

‡ As a matter of fact, at the time that this Aquatic Warbler was picked up, and during the previous hours of darkness, the wind, coming from the west, only blew with the force of a gentle breeze, *i. e.* force 3, as registered on the Beaufort scale. The weather condition was cloudy, with passing showers.

travelled with several other species which habitually visit the Tuskar on migration, including its close ally the Sedge-Warbler. And it is more than likely that other Aquatic Warblers consorted with it but escaped detection,* either because they did not strike the lantern, or, if they did, they fell into the sea, or on to an inaccessible part of the rock or where it is covered by the tide at high water, where they would soon be swept away, instead of falling on an accessible area of the rock where they would remain until the lightkeeper found them and picked them up. Although only one other bird was obtained on the same date, namely, a Wheatear, which struck the lantern at 2.30 a.m., nevertheless, I learn in a letter from Mr. Glanville, written on the morning he obtained the Aquatic Warbler (August 9th), that "there are birds at the lantern every night, but as weather is clear very few are striking." To substantiate the evidence that birds about this time were on the move at Tuskar he sent me: Willow-Warblers, found dead on the rock on August 6th and 8th; Sedge-Warblers, ditto, August 7th and 8th; a Wheatear, ditto, August 8th; also Wheatears which struck the lantern on August 7th and 8th. In regard to identification Mr. Glanville exercised due caution in not attempting to put a name on the bird offhand. This is what one would expect, for he had a very brief period in which to examine it before posting it, few specimens with which to compare it, and very little literature to consult. To add to this he was particularly busy preparing to go ashore himself that morning. Albeit he discriminated at once that the bird was no ordinary Sedge-Warbler, not only on account of the characteristic and conspicuous buff stripe running along the middle of the crown of the head, which many ornithologists lay so much emphasis upon as though it were the only distinguishing mark between the Aquatic and Sedge-Warbler, but also because the pattern of the plumage

* I have cumulative evidence to show that rare as well as common birds are apt to visit light-stations on migration in the plural even more than in the singular number; witness occurrence of Tree-Pipits at Tuskar Rock in September, 1913 ('Irish Naturalist,' November, 1913, p. 220), and of Reed-Warblers in September, 1912 (*ibid.* March, 1912, p. 50). *Vide* also remarks in my article on "Grasshopper-Warblers on Migration" ('Irish Naturalist,' August, 1912, p. 139). Indeed, the term *rare* is often more applicable to the periodical than to the numerical status of many species.

was different on the back and tail, and the colour of the legs was different. To quote Mr. Glanville's own words, he writes: "What do you think of the Sedge with spots on the breast (referring to an immature Sedge-Warbler sent with particularly well-marked spots on the breast), also the one found dead on the rock on the morning of the 9th, with head marked different to the rest, also spots on back and tail different, and legs and feet more flesh-coloured?" Having dried the bird and arranged its feathers, I was at once struck with the difference in the plumage not only of the crown of the head but of the rest of the upper parts, including the upper tail-coverts and rectrices (long tail feathers). In this immature Aquatic Warbler the markings of black and buff on the back are bolder and more clearly defined than on the immature Sedge-Warbler.* The buff is lighter and clearer, and the dark streaks more closely approach a black shade than in the Sedge-Warbler. In the latter the dark parts of the feathers are more mud-brown in colour. With the feathers lying in their proper position the bold striping of black and buff gives the back a somewhat "tiger-like" pattern of plumage, which is not apparent in the plumage markings of the Sedge-Warbler. In the Sedge-Warbler the buff and brownish markings of the back become ill-defined, and in some specimens the lower back feathers and upper tail-coverts merge into a brownish monotone; in the Aquatic Warbler the striped pattern in these regions is well maintained though not so boldly displayed as it is higher up on the back. In the Sedge-Warbler *all* the rectrices are dusky in colour with a mere thin trace of buff edgings; in the Aquatic Warbler both webs of the *central pair of rectrices* are broadly margined with buff, so that the median clear dark streaks which extend the whole length of the shaft are conspicuous; the rectrices of the Aquatic Warbler are also longer, narrower, and more acuminate than those of the Sedge-Warbler. The wings, however, of both species are remarkably alike †; but the purity in tone of the dark and buff markings is seen to advantage in

* In the mature Sedge-Warblers, especially in nuptial garb, these markings on the back are much less defined.

† For this reason Sedge-Warblers should be sent entire for identification. It is a bad practice to send a wing or a wing and a leg only.

the Aquatic Warbler. In both species the bastard primary is very small, while the third primary is the longest and shows emargination of the lower end of the outer web. The length of the wing, measured from the carpal joint to the extremity of the longest flight feather, corresponds to the average wing-length of the Sedge-Warbler. Compared with a number of Sedge-Warblers, I found that the beak was a shade shorter and a trifle more robust at the base. The colour appears to be the same in both species, *e. g.* upper segment and distal half of lower segment dark brown, proximal half of lower segment horn-brown. The feet and toes, much the same length in both species, are lighter in shade in the Aquatic Warbler and exhibit a light flesh tint; in the Sedge-Warbler the shade is horn-brown.

So much then for the external distinguishing characters in the two species. As already mentioned, it is the broad buff stripe running in a sagittal direction from beak to occiput which ornithologists seem to have paid most attention to, and have at the same time taken little account of the difference of the rest of the plumage. Saunders, for instance, in his 'Manual,' states that "the conspicuous buff streak down the middle of the crown in the Aquatic Warbler is an unfailing mark of distinction between this species and the Sedge-Warbler." In the description of the rest of the plumage no differentiating points are mentioned. Mr. Witherby and Dr. Ticehurst, writing on the occurrence of Aquatic Warblers since Saunders's book was published (2nd edition), 1899, say: "The Aquatic is much like the Sedge-Warbler in general appearance, but the broad buff line down the centre of the crown distinguishes it at once when seen in close quarters."* Mr. Barrington, writing on the only other Aquatic Warbler obtained in Ireland, says: "The buff stripe along the centre of the head, with a darker stripe at either side, which is separated again from a brighter stripe from the eye, sufficiently distinguishes this bird from its nearest ally the Sedge-Warbler."† Now, while the broad medial buff stripe is markedly conspicuous in the head of the Aquatic Warbler, and normally is not found developed to such an extent in the

* "On the more Important Addition to our Knowledge of British Birds since 1899." 'British Birds,' vol. i. p. 85.

† 'Irish Naturalist,' vol. xii., November, 1903, p. 300.

head of the Sedge-Warbler, a careful inspection of the latter species when immature shows it *is* present; furthermore, the black stripe immediately above the buff-coloured eye-stripe (superciliary stripe) is practically as well marked as in the Aquatic Warbler. This black stripe is also present in the head of the adult Sedge-Warbler in spring and autumn garb, but as the lighter markings of the crown of the head are considerably darker than in the immature bird, this dark stripe is much less conspicuous. All the same, it is quite definite. Hence this stripe and the lighter eye-stripe form no absolutely distinguishing character of the Aquatic Warbler. The black stripe in the Aquatic Warbler's head looks more conspicuous because the buff stripe is broad, light, and clear in colour, and forms a stronger contrast than do the markings on the crown of the head in the Sedge-Warbler.

If one were to examine quite casually the crown of the head of an immature Sedge-Warbler when the feathers were not lying absolutely in their proper position, one might get the impression that the head was speckled or at the most irregularly streaked with buff and brownish black markings. Such, however, does not represent the true pattern of the head plumage as it exists in life, or in the dead bird when the feathers are carefully re-arranged. In reality the plumage pattern of the head in the Sedge-Warbler (best seen in the immature bird) is made up of a narrow medial buff stripe, on either side of which are narrow alternating dark and light stripes, longitudinally directed, and disposed in a bilaterally symmetrical manner. The essentials of this pattern appear to be represented also in the head of the Aquatic Warbler, but while the stripes are of almost equal thickness in the Sedge-Warbler, we find that one of the buff stripes is remarkably thick and another is extremely thin in the case of the Aquatic Warbler. The thin, hair-like buff streak separates the broad black streak immediately over the buff eye-streak into two black bands, both of which are present in the head of the Sedge-Warbler and are separated by a stripe of buff. In the head of the Sedge-Warbler and in that of the Aquatic Warbler we find markings which, for the purpose of description, I propose to designate as follows:—A stripe of buff running along the

middle line of the crown from beak to occiput, *the medial buff line*. In the Aquatic Warbler this is very broad and clear yellow-buff in colour. In the immature Sedge-Warbler it is narrow and duller in shade; in the adult Sedge-Warbler it is much duller, and varies from dark buff to dusky brown. On either side of the *medial buff line* are two dark streaks. These may be called the *inner dark lines*. In the Aquatic Warbler they are clearer, darker, of a warmer hue, and broader than in the Sedge-Warbler. On either side of these are two light streaks. These may be called the *outer buff lines*. In the Aquatic Warbler they are exceedingly thin, though of the same colour as the *medial buff line*. In the Sedge-Warbler they are of nearly equal breadth with the *medial buff line* and of the same colour. On either side of the *outer buff lines* are two dark streaks which may be called the *outer dark lines*. Though darker and richer in colour in the Aquatic Warbler, they are of about equal thickness in both species. They lie immediately above the buff superciliary stripe, which is well-marked in both species and calls for no further notice.

Seeing, then, that there is an interesting inter-relation in the plumage pattern of the head in the two species—a pattern consisting essentially of alternating longitudinal buff and blackish streaks—and that the points of distinction are relative and not absolute, variations are not to be altogether unexpected. In a large series of Sedge-Warblers which I have examined, I have found gradations not only in the shade but in the relative thickness of the buff streaks, leading from the typical head plumage-pattern of the Sedge-Warbler to forms resembling that of the Aquatic Warbler (*vide* fig. 4). And, no doubt, if one could in the same manner go through as large a series of specimens of Aquatic Warblers, one would find variations approaching the head plumage-pattern of the Sedge-Warbler. The above remarks apply in the main to immature birds as they appear in autumn garb, at which season the buff in the head of the Sedge-Warbler is much lighter than in spring. If in the nuptial plumage a variety of Sedge-Warbler were found, in which the medial head streak was broader than usual, resembling in that respect the same streak in the head of the Aquatic Warbler, still, owing to the fact that

the buff of the former is at this season almost smoky brown, and of the latter bright yellow, it is plain that the heads of the two species would be much more distinct than if this variation presented itself in the head of the immature autumn Sedge-Warbler. I have mentioned that the distinguishing characters in the *whole plumage of the Aquatic Warbler*—not only those of the head—*should be clearly pointed out.* For if one is not well aware of the fact that the two species in immature garb are *quite distinguishable, apart from the head markings*, one is liable to fall into the error of thinking that a Sedge-Warbler, in which the medial buff head line is broad, is an Aquatic Warbler. I must admit that when I first obtained such a specimen of this type (fig. 4), I was not quite sure that I was not in possession of another Aquatic Warbler; all the more so, because its date of capture followed closely on the heels of that of the genuine Aquatic Warbler (fig. 5). However, by carefully comparing the bird with several Aquatic Warblers, in addition to the one obtained on Tuskar, I was able to refer this abnormally plumed Sedge-Warbler to its proper position. My best thanks are due to Dr. Hartert for affording me facilities to examine the fine series at Tring Museum, and also for confirming my opinion as to the species. In connection with this interesting question of variation in the plumage of the head of the Sedge-Warbler, I have selected four birds, together with the Aquatic Warbler from Tuskar, from which I have made photographs. These serve to illustrate:—The dark smoky buff and blackish streaked heads of the nuptial and mature autumn plumages (fig. 1), a dark type of buff and blackish streaked head found in some immature autumn birds (fig. 2), the more usual light buff and blackish streaked head of the immature autumn bird (fig. 3); and a further gradation in which the medial buff streak is conspicuously broad and light in colour (fig. 4); resembling the same in the Aquatic Warbler (fig. 5). Sex appears to play no part in these variations, except that there may be a slight tendency for the buff streaks to be darker in the immature male than in the female. However, it is interesting to note that fig. 4 is a photograph of a *male* immature bird, in which it has been pointed out the buff on the head is dominant and bright. Fig. 3 is a photograph of a female bird with another variation, *viz.* barring of the tail. I have a

male obtained at the same time with exactly the same pattern of head and with tail also barred. Passing on to other points in connection with the examination and dissection of the Aquatic Warbler from Tuskar, I may give the following additional details:—

Total length, 12.7 cm. Wings (right and left same length),* 6·1 cm. Bastard primary, 1 cm. (very small as in the Sedge-Warbler). Tail, 5 cm. Feet, 2·1 cm.; light flesh colour. Toes similar. Beak, ·85 cm. Upper segment and distal half of lower segment dark brown; proximal half of lower segment, yellowish brown. Weight, 3 drams, 13 grains. Condition, very good, much fat present. Sex, female. Age, immature. Plumage, first autumn, bright and clean. Gizzard, quite empty.

Previous Occurrences of the Aquatic Warbler in the British Isles.

Turning now to the occurrences of the Aquatic Warbler in the British Isles, we find that there is only one other authentic record from Ireland. This affects a bird which struck the lantern of the Bull Rock, Co. Cork, on September 20th, 1903—that is to say, ten years previous to the capture of my specimen. The bird from the Bull Rock was collected by Mr. Joseph Higginbottam, the light-keeper, who sent it to Mr. Barrington.† It proved to be an immature male. The Aquatic Warbler has, in all likelihood, touched upon the Irish coast on other occasions, but has been overlooked. It is quite possible that among some of the numerous wings chopped off by the lightkeepers and sent to Mr. Barrington, there may have been some which were not distinguished from those of Sedge-Warblers. This may appear a bold assumption, but I believe that it is worth making in order to show how unsafe it is to rely on the identification of closely allied species (whose wings are marked so very alike), by an examination of a wing, or of a wing and a leg only. And I understand that, until quite recently, Mr. Barrington solicited that, in the case of common birds, only these parts should be

* Both wings should be measured. A pair are not always similar in length.

† "The Aquatic Warbler—a New Irish Bird." 'Irish Naturalist,' vol. xii., November, 1903, p. 300. R. M. Barrington.

sent for purposes of identification. I cannot say that I am in favour of this procedure in regard to any bird, as in addition to what I have pointed out about the wings, much other information which might be gained from an examination of the whole bird in the flesh is thereby lost; certainly entire Sedge-Warblers should be examined.

The occurrences of this species in Great Britain have not been many, and may be summarised as follows:—One obtained in Sussex on October 19th, 1853, and first recognised by Newton. One obtained at Loughborough, Leicestershire, in the summer of 1864. One obtained near Dover in 1871. One obtained in Norfolk in September, 1896. The above instances are taken from Saunders's 'Manual of British Birds,' 2nd edition, 1899, p. 87. The same author also mentions that the Aquatic Warbler, figured in Hunt's 'British Ornithology,' is of a specimen probably obtained in Norfolk in 1815.

The following occurrences were recorded after the publication of Saunders's 'Manual,' together with a few omitted by that author:—One obtained in Hampshire, September, 1876; another September 20th, 1897; one obtained at St. Catherine's Lighthouse, Isle of Wight, September 29th, 1905; one seen September 7th, 1897, in Sussex; two obtained in same county, August 8th and 11th, 1902; and one obtained and others seen on August 18th, 1905. One was obtained in Norfolk on September 9th, 1902; a second seen on September 19th, 1903; and a third seen on September 15th, 1904. The above instances are given by Mr. Witherby and Dr. Ticehurst in 'British Birds,' vol. i. p. 85, in a paper entitled, "On the more Important Additions to our Knowledge of British Birds since 1899." Further notices of the occurrence of the Aquatic Warbler in Great Britain are as follows:—One killed at Eddystone Lighthouse, Cornwall, October 11th, 1907 (C. B. Ticehurst, 'British Birds,' vol. ii. p. 28); one obtained at Eastbourne, Sussex, on October 7th, 1908 (E. C. Arnold, 'British Birds,' vol. ii. p. 236).* One obtained at St. Catherine's Lighthouse,

* A good drawing of this bird is made; but I think that the dark shafts and middle portions and lighter edges of the rectrices are not brought out enough, and the upper tail-coverts are too grey, but the dark and light stripes of the back are faithfully depicted.

Isle of Wight, on the night of September 17th–18th, 1909 (H. F. Witherby, 'British Birds,' vol. v. p. 176); one (a male) obtained at Norfolk, on October 23rd, 1912 (Clifford Borrer, 'British Birds,' vol. vi. p. 220); one (a male) obtained at St. Catherine's Lighthouse, Isle of Wight, on August 17th, 1912 (A. M. C. Nicholl, 'British Birds,' vol. vi. p. 344).

It may be seen from the above statistics that, omitting the birds seen but not obtained, there have been procured during the last ninety-eight years seventeen specimens in Great Britain (England) and two in Ireland. The first in Norfolk in 1815. The last to date on Tuskar Rock, Co. Wexford, on August 9th, 1913. It is, no doubt, right to regard the Aquatic Warbler as a rare British bird, but its much greater rarity as disclosed by the earlier records has been apparent rather than real. Not only was the bird confounded with the Sedge-Warbler and specimens left unidentified for years—while probably others from time to time passed out of the hands of museums and private collections as Sedge-Warblers, to make room for valuable specimens—but also owing to the lack of observers at light-stations, many specimens, killed or captured striking, were never procured. Are view of the records which I have summarised show this clearly to be the case, for, with additions in the number of workers on the subject of bird-migration at light-stations, and through the co-operation and increasing vigilance of the light-keepers, we find that an increase in the number of records of rare birds touching our coastlands have come to hand. Two noteworthy instances of birds whose numerical and periodical status as migrants to Ireland have undergone marked change, *pari passu*, with our growth of knowledge on migration are to be found in the case of the Pied Flycatcher and the White Wagtail. When A. G. More—one of the greatest living authorities on Irish birds of his day—published his 'List of Irish Birds' for the Science and Art Museum, Dublin, 2nd edition, in 1890, the two species just mentioned were designated as *very rare visitors*. At the present time I should regard the Pied Flycatcher as a rather scarce and irregular visitor, chiefly in autumn, while the White Wagtail I should certainly designate as a plentiful spring and autumn migrant. In the same manner other species might be cited.

General Geographical Distribution.

Regarding the general geographical distribution of the Aquatic Warbler, Saunders details it as follows:—"The Aquatic Warbler seldom visits Heligoland; though it breeds sparingly in the southern parts of Denmark, Schleswig-Holstein, and on the southern side of the Baltic. In Holland and Belgium it is of rare occurrence; but in France it is found annually in the departments of the Somme and Nord. In the Brenne and beyond the Loire it arrives about the third week in April to breed; while further south in the Camargue, and similar marshy districts, it is not uncommon. Eastward it is fairly distributed throughout Germany, becoming abundant in Silesia, as well as in some parts of Poland, and only less so in Austria-Hungary. It breeds in many parts of Italy, Sicily and Sardinia, but in the Spanish Peninsula I have obtained it only in September. In North Africa it is probably resident. In the eastern portion of the basin of the Mediterranean it appears to be only a migrant or a winter-visitor, and the marshes of the Southern Ural form its boundary in that direction." * In conclusion, it may be noted that while the Aquatic Warbler is a species whose fly lines on migration appear to lie east and somewhat south of our isles, it nevertheless reaches and breeds in as high latitudes, *e.g.* Denmark and Schleswig-Holstein. And so we may expect to find it extending its flight westward, and turning up at light-stations with increasing frequency, as the workers on bird-migration go on adding to their numbers, and the light-keepers become more and more vigilant, and learn to discriminate better between common and rare birds.

Explanation of Plate.

Fig. 1.—Sedge-Warbler. Adult male, showing dark smoky buff and blackish streaks on head. Fig. 2.—Sedge-Warbler. Immature male, showing dark type of buff and blackish streaks on head. Fig. 3.—Sedge-Warbler. Immature female, showing light type of buff and blackish streaks on head. Fig. 4.—Sedge-Warbler. Immature male, showing broad buff line on head, simulating plumage pattern on head of Aquatic Warbler. Fig. 5.—Aquatic Warbler. Immature female, showing broad medial buff line on head.

* 'Manual of British Birds,' second edition, 1899, p. 88.

SOME ORNITHOLOGICAL WAR-NOTES FROM GREAT YARMOUTH.

By A. H. Patterson.

Surely others of your contributors besides myself have noticed unusual doings or movements among our wild birds as a result of the unrestfulness attending the noise and turmoil of the great war? The recent nocturnal visit of Zeppelins, I understand, sadly upset the Norfolk Pheasants, which crowed loudly their fright and annoyance at the unusual disturbance. Taken generally, I am inclined to think the remarkable scarcity of our usual winter visitors has been greatly due to the war—I speak now for my own neighbourhood—and I am somewhat of an opinion that the migrant hosts, in general, proceeded further southward. I certainly discovered fewer small birds washed up at the tide-mark during the period of the autumnal migration, a fact, perhaps, due to the removal of light-vessels and the suppression of coast lights, in comparison with what I have noted in other years. We also had fewer thick nights than normally, with much rain, and a remarkable insistence of winds from the south and westward. Then, too, we had very little ice and snow before Christmas; and, again, the old Breydoners' axiom that "No snow here afore Chris'mas—little fowl arterwards," would seem to have contained some truth in it.

As I remarked in the 'Zoologist' (1914, p. 392) early in the war, I noticed some inrushes of Starlings, probably birds ousted from the Flanders marshes; and the erratic incoming of scattered flocks of Gulls from the North Sea, their wild, tumbling, scared movements synchronising with reported encounters at sea. Huge flocks of various Gulls, on some occasions probably mustering 10,000 birds, were to be seen on Breydon in August during the early days of the war; there they must have played unprecedented havoc among the Shore Crabs (*Carcinus mænas*) as the days went by; and scarce enough became the carrion

(dead Dogs and Cats) that occasionally came to the surface in decaying sacks, or when the gas-inflated carcases came to the surface in defiance of bricks or stones attached to them: all carrion drifted to the "ronds" (saltings) was speedily skeletonized. This "gull-hunger" increased as the war proceeded and developed, and the great autumnal Herring fishery of the East Coast dwindled to small proportions, and finally to vanishing point. I need hardly repeat my remarks on the sad pass these interesting birds were brought to (*vide* 'Zoologist,' Jan., 1915, pp. 14–15) when the Herrings became scarce. In ordinary seasons the great numbers of Gulls that work southward to this neighbourhood find, as a rule, plenty of washed-up Herrings, with stale Mackerel, dead Weevers, Scads (Horse-Mackerel), Dog-fishes, and small Whitings, which have either dropped out of the herring-nets after being enmeshed, or have been thrown back into the sea by the fishermen when "scudding" (cleaning and clearing) their nets when coming home from the fishing grounds, or that have been dropped in the river and carried out on the ebb, and thrown up afterwards on the sands at the harbour-mouth by the flood-tide.

Day by day the hungry birds swarmed to the sands, just north of the Gorleston Pier, and stood about listlessly but with evident watchfulness for any small mercy in the shape of broken Herring, or any other edible, thrown shorewards by the waves, on sight of which a great commotion followed, with a screaming chorus of disputation and the fluttering of a thousand wings. On some days, I am confident, many a bird "went supperless to bed"—a cold one at that, on mudflat and flooded marsh. That new departure—their frequenting of the fish-wharf and the roosting on the top of gutting- and curing-sheds—was a novelty as far as Yarmouth and Gorleston are concerned, although for a year or two previously, on scarce days, the various big Gulls ("Greys," and adult Saddlebacks, and Herring-Gulls) had begun to perch upon the tops of the pyramids of empty and full barrels. The sight of "swills" of Herrings on the wharf, and the "troughs" of fish in the pickling-yards tempted them to the busier haunts of men, and the pity shown them by the fishing fraternity, coupled with a certain immunity from molestation, reassured them. For a number of days broken fish was thrown

to them, and their agility of seizure and exploitation much interested and entertained the onlookers. That a Gull can go days without food I am assured; a gunner brought to me a grand-plumaged old Greater Black-backed Gull from Breydon; evidently he had given it a "body shot," but as it appeared to promise it, I gave it a chance of recovery. For over a week he looked at, but entirely refused, every tempting morsel—sliced Herring, milt, &c., contenting himself with a sip now and then at the tank in my small aviary. On the seventh day I found him dead. It may seem to have been a cruel experiment, but I did my best for him.

The small Gulls (Common and Blackheads) very speedily gave up the contest on the foreshore, the former going away altogether, the latter haunting the river, where scraps from the drains and from various vessels were thrown overboard. Later on, when the fishing had come to an end, and the marshes stretching from Yarmouth to Norwich, and Beccles and the Broadlands, became considerably flooded, owing to continuous rains, the Gulls spread themselves around for many miles, the larger ones undoubtedly in quest of drowned-out Field Mice and Water Voles; and the smaller ones in search of the plentiful supplies of Earthworms and larvæ (that of the *Tipula*, in particular), which kept them going some time. The Lapwings from the uplands and further northward also joined them in their search for the smaller prey. I may venture, I think, to prophesy a scarcity of that grass pest, the "leather-jacket" (*Tipula* larva) during the coming months. Of late the larger Gulls have become scarce, their instincts, and, mayhap, memories having taken them northward again to wait on the Scotch Herring fishers; and may they fall on better days!

I might here add that at about Christmas time a number of large Gulls discovered a big deposit of "salt and scales" (a valuable waste product bought up by manure merchants, which are the sweepings from the herring-boats and fish-houses) that also contained broken Herrings and entrails, and they speedily made inroads upon the heaps. It was only by the flinging over of a foot-deep layer of more salt that the birds were kept off; even then I observed here and there, as did the owner, a gap made by hungry birds, and the fish-refuse got at. To me it is

remarkable that a sea-bird should be able to swallow so much salt, or even to satisfy its thirst by sipping sea-water!

After a time some birds get somewhat accustomed to strange sights and sounds; and notwithstanding the great bewailing of the old Breydoners over the increase of railway unrest—that "it would drive away all the fowl"—the fowl they mostly referred to (the Wigeon) still haunt Breydon in spring, often in some numbers, hardly troubling to rise on the wing at the rumbling by of a train, a few hundred feet across the north-west wall. The Gulls, that were at first sadly put about and scared by the earlier aeroplanes that came hovering over the flats like huge Hawks, now pay little heed to them; and I was much interested in seeing a swarm of Gulls following up a fishing-boat to the harbour on that morning, when, half an hour before, the guns of the German cruisers had been booming discordantly in the Roadstead.

In the middle of October a beach gunner informed me that he had seen several very dirty-looking Guillemots and Razorbills in the breakers, which seemed more or less unable to fly, or to swim with anything like their usual ease. One or two had been tumbled ashore on the easterly wind. I at once turned to the south beach, where, in the course of a mile, I found a dead Razorbill at the tide-mark, its white under parts soiled as with tar or black varnish; the wing-feathers were bedaubed and sticky, many of those on both wings adhering to each other. A miserable Razorbill feebly struggled in the surf, and in a few minutes was tumbled ashore, but on each attempt to stalk it, it wobbled, seal-like, down the wash and dived under an incoming breaker. Once again it came ashore, scrambling up to the tide-mark, when I threw a stone at it, mercifully stunning and killing it; it, too, was besmirched with the stuff, which might have been petrol; but whatever it was, it had dried rapidly on the plumage.

Quite a number of others came ashore between Caister and Corton, all more or less bedraggled. I suspect that some unfortunate submarine or destroyer had been sunk, and the liquid had, after an explosion, come to the surface. Not long before this our navy had destroyed enemy boats in the North Sea in a locality frequented by these birds. Mr. F. C. Cook, of Lowestoft,

made some observations in his neighbourhood; and he assured me parts of the beach at Corton had become quite black and tarry, a condition very soon obliterated by drifting sand.

One live Razorbill brought me, that was rather cleaner than the general run of the birds, with a Guillemot, was placed in my small aviary; the former died after a day or two's incarceration, vicious and irritable to the end. The Guillemot, that probably had not been quite so pounded by the waves, lived several days longer, became tame enough to feed from my hand, and would utter a throaty croak of satisfaction when I scratched the top of his head. I have never been successful in keeping either of this species alive for long, as I have the Cormorant, Shag, Gannet, and some others, nor do I think the first two species ever prove satisfactory livers, even if taken unhurt from their native cliffs.

On October 29th I walked along the beach to Hopton, on the Suffolk coast, finding the high-water mark bestrewn with the moulted feathers of the larger Gulls. On most of them were dry spots and splashes of the offending liquid; evidently the Gulls had been freely sprinkled with polluted sea-spray, but being of a more restless and suspicious nature had wisely betaken themselves to less unpleasant quarters. A fisherman assured me that on one occasion the crew of a herring-boat could not shoot their nets "for the tar on the surface—the sea bein' black all around, and smuddered with it."

It was reported in a local paper that (late in January) when the German cruiser 'Bluecher' sank in the North Sea, mingled with the human beings struggling for existence were arms, legs, and clothing, with thousands of dead fish (undoubtedly killed by explosions); to the latter the Sea-Gulls flocked to enjoy a feast such as had not come in their way for many a day, thus proving that their appetites had very speedily overcome their apprehensions.

THE PHARYNGEAL TEETH OF FISHES.

By Colonel C. E. Shepherd (Indian Army).

(Continued from vol. xviii. p. 272.)

Symbranchidæ.

Amphipnous cuchia is an Indian fish that is provided with respiratory air-sacs, enabling it to breathe when buried in the mud of dried-up swamps, or lying amidst the weeds at the sides of tanks. It has no gill-rakers, and only three branchial arches. The upper pharyngeal teeth are in a circular group on the head of the third epibranchial; they are so much embedded in mucous membrane as not to be easily seen, but are quite palpable to the touch if a finger-tip is pressed against them. In a similar way cognisance can be taken of the existence of the lower pharyngeal teeth.

Fierasferidæ.

Fierasfer acus has three big, horny gill-rakers which stand up on the first cerato-hypobranchial arch; the one at the angle being contained about two and a half times in the length from the angle to the end of the hypobranchial: there are three tubercle gill-rakers on the first epibranchial. The other arches are furnished with tubercle gill-rakers. The upper and lower pharyngeal teeth are minute, and in each case grow in elongated groups. These fishes have a curious habit of spending part of their lives, possibly for shelter, in the interior of Sea-Slugs (Holothurians), and also in bivalve Mollusca.

Scombresocidæ.

Belone acus is a Mediterranean fish, similar to the "Gar-Pike" of the English coasts. The upper pharyngeal teeth are in two distinct groups on each side; the upper group, long and narrow, has villiform teeth; a row of these along the inner margin stand out. The lower group is triangular in shape with a pointed apex and rounded base; it has villiform teeth. The lower pharyngeal teeth are in one long triangular

group of villiform teeth, occupying the whole floor of the gullet. The lower pharyngeal bones are united.

Ammodytidæ.

Ammodytes lanceolatus, the Greater Launce, also called the "Greater Sand Eel," has nineteen long, horny gill-rakers on the first branchial arch, cerato-hypobranchial portion; the length of the longest equals the depth of the gill-laminæ below it; there are four on the epibranchial. The second and third arches have similar but shorter gill-rakers on their outer sides, whilst on the fourth arch they are shorter still. The upper and lower pharyngeal teeth are very minute, barely but just palpable to the touch; under the microscope they show as cardiform teeth.

Atherinidæ.

Atherinichthys argentinense, called the "Pajerry" at Buenos Aires, has thirty-three long horny gill-rakers on the first cerato-hypobranchial arch, with nine on the epibranchial. They all carry teeth. The first thirteen along the cerato portion counting from the angle have their tips turned backwards, as also are the tips of the first two on the epibranchial. The length of the longest gill-raker is equal to the depth of the gill-laminæ below it. The inside of the first arch, and both sides of the second, third, and fourth arches all carry numerous short horny gill-rakers bristling with teeth; these gill-rakers fit closely between themselves and form a very good filter. The upper pharyngeal teeth consist of a long narrow group of minute cardiform teeth on the limb of the third epibranchial, and two long, narrow, roughly elliptical shields on each of the heads of the third and fourth epibranchials, bearing strong conical teeth in the upper half of the shield, with rather smaller conical teeth in the lower half. The lower pharyngeal teeth are in two elongated groups with strong conical teeth at the back part, those in the front part being smaller. There is a marked division in the middle line between the two sets. There is a small group forming four sets of minute teeth, each set apart, at the junction of the second and third hypobranchials with the basibranchials, and also one group stretching across the basibranchials at the junction of the third and fourth arches. (Fig. I.)

Atherinichthys bonarense, the Sea Pajerry, also from Buenos Aires, has twenty-two long horny gill-rakers on the first ceratohypobranchial arch, with six on its epibranchial. They all carry teeth; the longest gill-raker equals in length the depth of

FIG. I.—ATHERINICHTHYS ARGENTINENSE.

the gill-laminæ below it. The inside of the first and both sides of the other gill-bearing arches have numerous short gill-rakers bristling with teeth; these gill-rakers fit very closely together. The upper and lower pharyngeal teeth are similar to those of the last described fish.

Polynemidæ.

Polynemus tetradactylus is known and appreciated as a table fish in Calcutta as the "Mangoe Fish," and also as the "Tapsi Machli," the latter being its native name. It has seven long horny gill-rakers on the first cerato-hypobranchial arch, with five on the epibranchial. The longest equals the depth of the gill-laminæ below it. These gill-rakers all carry teeth. The inside of the first arch has only three short horny gill-rakers. The second and third arches have small flat tubercles for gill-rakers, but only on the cerato portion, and on both sides of these arches. The fourth arch has a few similar but even smaller tubercles on its outer side only. The whole surface of these arches, tubercles and all, is covered with minute villiform teeth, which extend also to the surface of the basi-branchials and on to the tongue. The upper pharyngeal teeth consist of a small elongated group on the upper portion of each of the first epibranchials, also a longer group on the heads of each of the second epibranchials, with minute teeth extending along the rest of the limb; a triangular group on the heads of the third epibranchials, with teeth also extending down the limb, and an irregularly shaped group, square at the top and rounded at its lower part, on the heads of the fourth epi-branchials; below this last group, separate from it but still on the fourth epibranchial, is a small triangular group. All the teeth on the third and fourth epibranchials are cardiform. The lower pharyngeal teeth are in two elongated groups, on the fifth arch making a broad V in the mouth, but separated at the apex.

Ophiocephalidæ.

Ophiocephalus marulius, called the "Mŭrrŭl" in India, has fourteen tubercle gill-rakers on the first cerato-hypobranchial, with one on the epibranchial of a large size. There are five tubercles behind the angle also, at the base of the accessory breathing apparatus. All the other gill-rakers are also tubercle-shaped; they fit closely into one another and form a good filter. The tubercles all carry minute teeth. The upper pharyngeal teeth consist of a narrow group on the head of the second epibranchial, of minute cardiform teeth, and a fairly large group on the heads of the third and fourth epibranchials,

of conical teeth, with many of a larger size standing up amongst them. The lower pharyngeal teeth are in a group extending across the mouth in an open V-shape of similar teeth. A circular group of teeth is also apparent on each side of the junction of the third hypo- with the basibranchials. There is an elongate group of minute cardiform teeth on the parasphenoid; the right half of this is shown on the left side of the illustration.

FIG. II.—OPHIOCEPHALUS MARULIUS.

(Fig. II.) Incidentally it may be noted that the figure shows part of the accessory branchial apparatus. This fish lives buried in the mud of dried-up tanks and swamps during a long period of dry weather; respiration is carried on by this apparatus from atmospheric air. To show the upper pharyngeal teeth clearly, the roof of the gullet has been pulled forcibly backwards, throwing the branchial apparatus out of its proper

place, which is behind the epibranchials. As seen in the illustration, it looks like a piece of shelled walnut, at the upper right-hand corner.

ANABANTIDÆ.

Anabas scandens, the "Climbing Perch" of India, is another fish provided with accessory branchial apparatus enabling it to live a long time out of water, breathing atmospheric air direct. At the angle of the first branchial arch, and from thence along the cerato-branchial, there is a broad piece of cartilage that engages against a similar piece of cartilage on the first epibranchial. Beyond the cartilage on the first arch there are eight gill-rakers, the first three or four being of fair size, the remainder very small. On the other arches the gill-rakers are all small and tubercular. The upper pharyngeal teeth are strong cardiform teeth in two circular groups. The lining membrane of the mouth above the upper pharyngeal teeth has prominent papillæ. The lower pharyngeal teeth show as one broad patch across the floor of the mouth, with round-topped teeth deeply embedded in mucous membrane.

MACRURIDÆ.

Macrurus armatus, a deep-sea fish, has nine upstanding tubercle-like gill-rakers on the first cerato-hypobranchial arch; these all carry teeth standing well out on the summits of the tubercles. The longest of these tubercles is about three-fourths of the depth of the gill-laminæ below it. The above gill-rakers are on the upper surface of the cerato-hypobranchial; there are five smaller tubercles, that also carry teeth, on the outer surface, but none on the inner. The second and third arches have toothed tubercle gill-rakers on each side; the fourth arch has them on the outside only. The teeth in the tubercles vary in number from four to eight or ten. The upper pharyngeal teeth consist of a little group on the limb of the third epibranchial, of cardiform teeth, and two circular groups on the heads of the third and fourth epibranchials. The lower teeth in these groups are much stronger than those in the upper portion of the group. The lower pharyngeal teeth are in two triangular-shaped portions touching one another along one side so as to form a broad V in the mouth.

Macrurus investigatoris, a deep-sea fish from the Indian

Ocean, got at 446 fathoms (2676 ft.), has no gill-rakers on the outer side of the first arch; a piece of membranous skin is fastened to it and to the side of the mouth, and there is a slit opening between the skin and the arch. The inner side of this arch has small tubercles for gill-rakers. There are ten upstanding tubercle gill-rakers on the outside of the second arch, with smaller ones on the inside. Both sides of the third and the outside of the fourth arch have similar tubercle gill-rakers. They all fit into each other fairly closely, and they all carry needle-point-like teeth. A large group of cardiform teeth on the heads of the third and fourth epibranchials form the upper pharyngeal teeth. The lower pharyngeal teeth form a V-shape on the floor of the gullet. On the head of the second epibranchial there is a small patch of well-marked papillæ.

Bathygadus furvescens, a deep-sea fish from the Indian Ocean, got at 555 fathoms (3330 ft.), has twenty long horny gill-rakers on the first cerato-hypobranchial arch; the longest one, at the angle, being one and a half times the depth of the gill-laminæ below it. There are five similar gill-rakers on the first epibranchial. All the gill-rakers are feebly toothed. On the inside of the first, both sides of the second and third, and the outside of the fourth arch there are short horny gill-rakers. For the upper pharyngeal teeth there is a group on the limb of the third epibranchial of small cardiform teeth, and an oval shield with rather larger cardiform teeth on the head of the same; and a rather large group, but of smaller sized teeth again, on the head of the fourth epibranchial. Two small distinct groups of teeth form the lower pharyngeal teeth.

Berycidæ.

Hoplostethus mediterraneus. The specimen examined came from the Indian Ocean, and was got at a depth of 320 fathoms (1920 ft.). It has fourteen long horny gill-rakers on the cerato-hypo portion of the first branchial arch, with six on the epibranchial. All the gill-rakers are teeth-bearing. The longest one, at the angle, is twice the depth of the gill-laminæ below it in length. On the outside of the second arch the gill-rakers are fairly long, but much shorter than those on the first arch; on the inside of the first and second arches, on both sides of the

third, and on the outside of the fourth arch there are short horny gill-rakers. They do not form a close filter. The upper pharyngeal teeth consist of a short thin line of cardiform teeth on the head of the second epibranchial. A long group of cardiform teeth is fixed to the heads of the third and fourth epibranchials, which terminates upwards in a point at the level of the head of the second epibranchial, and with its lower part swollen out; also a thin line of similar teeth on the limb of the third epibranchial. The lower pharyngeal teeth are in two narrow, elongated groups with a marked division between them.

Centrarchidæ.

Kuhlia marginata, a fish from New Guinea, has eighteen long horny gill-rakers on the first cerato-hypobranchial. They have teeth. The longest is one and a half times the depth of the gill-laminæ below it. There are six on the epibranchial. The other arches have short outstanding gill-rakers on both sides, as has the inner side of the first arch. They make a good filter. The upper pharyngeal teeth are in two groups; one on the head of the second epibranchial, the other on the heads of the third and fourth. They have small cardiform teeth, the points of which just show through the mucous membrane surrounding them. The lower pharyngeal teeth are smaller.

Toxotidæ.

Toxotes jaculator is a fish from India that has the curious habit of shooting a pellet of water at flies sitting on grass or weed stems overhanging water, and knocking them into the water to be then eaten. The natives of Bengal keep this fish in captivity to watch this curious performance. It has five long horny gill-rakers on the cerato-hypo of the first branchial arch; these are rather widely spread out. There was one soft gill-raker on the first epibranchial's right side, whilst the left side had two. There are no other gill-rakers. The upper pharyngeal teeth consist of a long, fairly large group of minute cardiform teeth on the head of the second epibranchials, and a larger group of similar but stronger teeth on the heads of the third and fourth epibranchials. The lower pharyngeal teeth are on two separate long plates with strong cardiform teeth on the inside edge near the œsophagus, those more forward being smaller.

(To be continued.)

BIRD-NOTES FROM THE MEDITERRANEAN.

By G. Bathurst Hony, M.B.O.U.

During the training cruise of 'H.M.S. Cumberland,' in 1911, I spent four months in the Mediterranean, and possibly some notes on the birds seen may be of interest.

We left Plymouth on January 17th, 1911, and our original escort of sea birds soon departed; on the next day, however, we were joined by some Lesser Black-backed Gulls when about one hundred and forty miles from land (46° 26′ N, 7° 40′ W). We reached Gibraltar on the 21st, and here I saw some Sand-Martins (the only ones seen during the whole cruise), Blackcaps, a Chiffchaff, and a Black Redstart. The next day I saw a Whitethroat, and put up some Barbary Partridges at the very top of the Rock. The Gulls at Gibraltar were mostly Lesser Black-backed and Black-headed, with a few Herring-Gulls.

We left Gibraltar on February 5th and reached Algiers on the 8th, but though we spent six days there I had little opportunity for bird watching. We were at Malta from February 16th to the 25th, but almost the only birds seen were Maltese Sparrows. We sailed for Alexandria on the 25th, and few birds were seen till about three hours out of Alexandria on the 28th, when a Kestrel joined us and settled on the foremast. I was unable to land till March 3rd, on which day I saw Turtle-Doves, White Wagtails and Spotted Flycatchers. On the 5th, Swallows, Willow-Warblers, Meadow-Pipits and Hoopoes were seen. The Black-headed Gulls were just obtaining their breeding plumage. Leaving Alexandria on the 13th we reached Cyprus the next day, and when some twenty-five miles from the island a party of Wagtails flew round the ship but were not identified. On landing on the 14th I saw Swifts, Swallows, several flocks of Goldfinches, some Hoopoes, Peewits and a Chiffchaff, and the next day a pair of Stonechats.

On the 18th we sailed for Platea (South Greece), which we

reached on the 21st. During our passage among the islands, before reaching Platea, there seemed to be a great scarcity of Gulls, but at Platea itself there were plenty—mainly Herring-Gulls, but with a few Lesser Black-backs and Black-headed. On landing I saw some Jays, and found a Common Buzzard's nest with four eggs situated in the topmost twigs of an oak tree, and I made many attempts to photograph it without much success. However, I spent a good deal of time watching the birds change rounds at the nest and moving about in its vicinity; the female was much the shyer of the two, and would not return to the nest while I was near. One day I saw a Hooded Crow come to the nest with the evident intention of egg stealing, but the owners returned in the nick of time, and he made off, though on another occasion I saw one of them being mobbed by a Hoodie. I once found a small snake (dead) in the nest, but otherwise never saw what the birds fed on. The Hoodies at Platea used to come and feed round the ship with the Gulls, picking up scraps from the water; I do not know if this is a common habit, but I have never seen it elsewhere.*

On the 23rd I saw Magpies, a Hoopoe and a Sparrow-Hawk; and on the 26th a Black Redstart and a Wheatear (sp. ?). On the 27th a pair of Ringed Plover arrived and remained a few days when they disappeared, and a pair of Egyptian Vultures were seen in the distance.

On April 1st Swallows arrived in large numbers, and on the same day I found a nest in a hole in a tree made of dry grass and lined with feathers, in which were eight eggs, which I took to belong to a Great Tit; but I did not get a good look at the bird.

On April 3rd we sailed for Venice: during the night there was a strong W. N. W. wind, and I woke up in the morning to see a Swallow sitting at the head of the hammock next to mine. This bird soon died, but another which had arrived during the night was more fortunate. At 7.0 a.m. a small bird, reported to me as a Hedge-Sparrow, joined us, our position at the time being 42° 21′ N, 16° 30′ E. As we entered Venice on the 5th I saw the first House-Martins of the trip, and after staying five days at

* The Indian House-Crow (*Corvus splendens*) may be seen feeding in this way along the Hooghly and in Colombo Harbour, among the shipping.—Ed.

Venice we returned to Platea, arriving on the 12th. The place had absolutely changed, for whereas when we left, less than ten days before, all was bare, now everything was green. There were quantities of Swallows, but otherwise I saw nothing interesting during this visit, and the Buzzard's eggs were not yet hatched.

We left for Malta on the 15th, and the next day—Easter Sunday—was the roughest we had during the whole cruise, with a strong north wind. At 11 a.m. a pair of Purple Herons joined the ship, they seemed very tired and looked as if they wanted to perch, but whenever after much effort they had got into position to do so, they fell right back to leeward, and had to beat up again. They remained with us about two hours, and as they left while I was below, I cannot say in what direction they went. A Wheatear was seen at the same time (position 37° 8′ N, 18° 3′ E), and during the afternoon a Turtle-Dove left the ship flying north.

Instead of going straight into Valetta, we spent several days to the south of the island, waiting till the weather would permit us to fire our gunlayers' tests. On the 19th a House-Martin joined us, and on the 23rd, while steaming about some eight miles south-west of the island, several Turtle-Doves passed us, and a Blue-headed Wagtail kept with us and occasionally settled—wind N.E. by N. We went round to Valetta on the 24th, and I saw a Whitethroat, a Pied Flycatcher and a Wood-Warbler; the Sparrows had young. The next day the place was crowded with these birds, and in addition I saw a pair of Blackcaps and a Nightingale.

On the 26th the bird catchers had numbers of Blue-headed Wagtails and Meadow-Pipits, which they had caught the day before, and I saw some Collared Flycatchers. At Valetta itself there were no Swallows or Martins, but in the middle of the island on the 27th I saw several. On the 29th the bird catchers had a Golden Oriole.

On April 30th we sailed for Gibraltar, and on the next day a Swallow and Turtle-Dove joined us, our position being 37° 15′ N, 10° 55′ E, and the wind north-west. We reached Gibraltar on May 4th, and I saw numbers of Swifts, but no Swallows till two days later, and no Martins at all. From Gibraltar we went to Arosa Bay (North Spain), and so back to England.

BIRD-NOTES FOR OXFORD DISTRICT IN 1913 AND 1914.

By H. G. Attlee.

February 23*rd*, 1913.—A Ring-Ousel seen on a fallow with some Fieldfares near Eynsham. This seems very early, but there could be no mistake as to the bird; apart from the white collar, it was both larger and browner-looking than a cock Blackbird, which at one time was close to it. Its movements, too, were different and more like those of a Mistle-Thrush.

May 8*th*.—A large wader migration over Oxford from 11.45 to 1.15 p.m., the night being very still, damp, and dark. The following recognized:—Dunlin (almost incessantly passing), Knot, Common Sandpiper, and Golden Plover (once); also a note which sounded rather like the "ke-wick" of the Brown Owl, but less loud, and, in fact, between that and the Peewit's ordinary note; it was certainly neither of those birds, and was quite strange to me. [At the end of July I heard the same cry on the shore near Barmouth, and it came, I think, from two birds which looked like largish waders (or possibly Terns), but I was too far off to see them properly.]

29*th*.—Flushed a Snipe in boggy ground near Wytham, which looks as if there was a nest near there.

March 11*th*, 1914.—At Blenheim. A party of some two dozen Tufted Ducks (equal number of each sex about) seen on a quiet part of the water. They allowed a very near approach, but remained mostly merely swimming to and fro, and dived very little.

April 13*th*.—While watching them, a Great Black-backed Gull passed over quite low down to the north. As it came up towards me over the trees it looked so huge that I took it for a Heron. It was so near that there could be no doubt of its species.

14*th*, 22*nd*, and 29*th*.—I again saw a single large Gull flying

in the same direction near Oxford; but these were too high to be sure of the species—in one case (and probably in the others) it was a Lesser Blackback.

During April the summer birds arrived, rather early in some cases:—Blackcap, 12th; Martin, 13th; Redstarts (several), 13th; Whitethroats (three or four), 14th; Sedge-Warbler, 15th; Lesser Whitethroat, 17th; Reed-Warbler, 19th (by far my earliest record); Swift, 23rd (many, 29th). A pair of Redstarts just outside the town seemed to be already settled at their nest-site on the 19th.

18*th*.—One Black and three Common Terns at Medley Weir. I first saw the Black Tern beating to and fro over the river, but keeping within a radius of some twenty yards. It kept for the most part some six to ten feet above the surface when working downstream against the wind, occasionally dropping down to, and two or three times momentarily settling on, the water; this evidently in quest of some insect (rather than fish), for it never even dipped its head below water. Its flight, compared with the Common Tern's, seemed lighter and less steady, and more like the Little Tern's. Later it settled on a large stake in the water, and on approaching I then saw the three Common Terns also resting on some other stakes, and all four birds hovered about these for some time, settling, and again flying off. The Common Terns then went farther down river, but the Black one remained and resumed its flying up and down, only moving a little farther off as I approached, till a passing Rook began to mob it, and chivvied it so hotly that the Tern cried out in distress, and, mounting to a considerable height, went right away up the valley out of sight.

A Willow-Wren was already starting to line its nest with feathers by April 26th, and a Chiffchaff's nest was ready for eggs by the 29th.

28*th*.—Found a nest of the Grey Wagtail in a low stone wall on a secluded part of the Evenlode. The birds went into the hole, and as both remained evidently very anxious close by, uttering their calls, and "balancing" their long tails, I concluded there were young. Just here the stream is so noisy and rapid as to be quite in keeping with these birds, and to recall their typical Welsh haunts. Some week or more later I

was surprised to flush a pair at Godstow Weir, but only saw them this once there.

May 23*rd.*—I saw what must have been a pair of Sheldrake rising from the neighbourhood of the river near Binsey and flying over the town to the eastward; and on June 11th a single Black-headed Gull was frequenting the river a little higher up.

June 6*th.*—Two Wrynecks at Sandford—the only ones I've seen in the district. At this date I suppose they must have been nesting here.

October 15*th.*—Saw what was almost certainly a hen Cirl-Bunting on farm land at Littlemore. As it rose close to me it showed a very distinct greenish rump, and while momentarily perched near looked like a dark-coloured hen Yellowhammer.

17*th.*—Three Grey Crows on the sewage-farm, Sandford, and a few Bramblings seen near there.

18*th.*—A Jack-Snipe near Iffley, and a largish flock (some thirty to forty) of small Finches, either Redpolls or Siskins, about trees in Christ Church Meadow.

21*st.*—Great Tit sang (once or twice about now), and a Chaffinch attempted to sing.

25*th.*—Swallows and Martins last seen.

26*th.*—A Quail flushed very close from the hedgebank near Beckley.

November 1*st.*—Fieldfares first seen.

5*th.*—A bird I believe to have been a Red-throated Diver (or else one of the Mergansers) flew high over Bagley to the northward (a south-easterly gale at this time); and a Coot seen on Hinksey Reservoir.

7*th.*—Two or three Coots on river near Eynsham. On the lake at Blenheim found some six Crested Grebes at least, and some Duck with a harsh "kurr"-ing note (probably Pochard). A Heron passed over, and a Green Sandpiper was heard by the lake.

19*th.*—A Snipe, alarmed by someone on the opposite bank, flew across the river by Sandford Lock, and settled on the bare edge of the water some seven to ten yards in front of me, but unfortunately almost hidden by the overhanging bank. As it came flying over towards me (and for the moment I saw it before it flew) it seemed to me distinctly *grey* in general hue, so that I

put it down for one of the shore waders, and never thought of it as a Snipe; *so* grey, in fact, that from this (as well as its size) I expected it would prove to be a Knot (rather than a Dunlin). It came, too, from a bit of bare muddy ground (the only cover being a thin hedge), and when flushed, just flew straight across to me almost! This seems unlike a Snipe, unless it was in a most exhausted condition.

I now tried to get close above it on the bank, but unfortunately it rose just then, and flew back straight over me, so that I could not see the colour of its upper side at all, or, indeed, get any clear view of its colour at all again, as it flew swiftly, and though it flew round two or three times before again settling it did not again come near enough to note this.

It was only now, when flying round, that I saw that it had too long a bill for anything but a Snipe. Its flight was certainly Snipe-*like*, though, when rising, it did not twist about, nor did it seem so very swift as the Snipe's usual flight is. It uttered no note at all. As a rule, I think, Snipe seem, when flushed once (let alone twice), to go right away; but this bird finally went down on to the island in the backwater only some fifty or sixty yards off. There was a frost that morning, but I think westerly gales just before. Is it possible it could have been *Macrorhamphus griseus*? Though its tameness, &c., might be accounted for in a Common Snipe (though there had been no really hard weather at all), I find it difficult to think that this bird, which looked like a Knot or something of that kind in colour, could be a Common Snipe. This day I again saw a Black-headed Gull over the river.

29*th*.—A Green Sandpiper flew high over Marston.

Within the last few months I have seen the following varieties near here:—a Sparrow, which appeared to be nearly uniform fawn-colour; a Blackbird with head specked with white; and a Rook with almost the entire wing-quills white, except, I think, the tips.

NOTES AND QUERIES.

MAMMALIA.

Longevity of Hedgehog.—For some time during the latter part of last century my grandfather had in his possession an English Hedgehog, which attained the age of twenty years. It disappeared one winter; whether it died or escaped to the common is unknown.—(Miss) M. Callard (Dulwich).

Distribution of Polecat and of Yellow-necked Mouse.—As I am making enquiries concerning the past and present distribution of the Polecat in this country, I should be grateful to any of your readers who could tell me whether it still occurs in their counties, and, if not, when it was exterminated. I am also trying to work out the distribution of the Yellow-necked Mouse, and should be equally grateful for any information about it.—(Miss) F. Pitt (The Albynes, Bridgnorth).

AVES.

Rare Nesting-site for the Goldfinch.—During the season of 1914 I found a nest of the Goldfinch built in a hazel bush about nine feet up. This I am sure must be a tree rarely selected by this species for nesting purposes. I have found them nesting frequently in yew, lilac, medlar, maple, and fir; uncommonly in laburnum, lime, ivy, and gorse; commonly in chestnut, sycamore, elder, elm, hawthorn, plum, apple, and pear. Can readers add more species of trees to this list? I have heard of nests in the common laurel and the walnut, but I have not yet been fortunate enough to find one in either.—Stanley Lewis (Wells, Somerset).

Birds Travelling North in Autumn.—Anent the several notes that have appeared recently in the 'Zoologist' under the above heading, I have had an idea for several years, which is developing into a theory; that is, that with many species of migratory birds (and most species are more or less migratory), these birds, and more particularly the young of the year, work a little northwards of their nesting-places before undertaking the autumnal journey south. Also

that this habit may account chiefly for the fact that almost every species that is extending its breeding range is extending it in a northerly direction. The evidence that I have been able to collect would be difficult to prove with respect to the smaller birds, although it appears to me to be quite apparent. But with some of the larger birds, and more particularly with some of the Terns, I have indisputable evidence that several young birds—on different occasions—have distinctly moved north before taking their long southern journey. I merely throw out the idea at present, as probably other observers will have noticed the same thing.—H. B. Booth (Ben Rhydding, Yorks).

Hen Pheasant Transporting Chicks.—On June 9th of last year, at a beautiful and secluded spot on our Somerset moorlands, a gamekeeper and myself on coming up one side of a rhine which divided meadow land from a swampy wood of birch and sallow, walked or rather intruded suddenly upon a female Pheasant. Her immediate behaviour on being discovered was apparent agitation, for she quickly ran round and round in a small circle with wings nearly extended and clucking excitedly, as though trying to shelter her brood; just as quickly I had noticed a chick in the grass, and moving away to a short distance we watched her from behind a bush. In a minute or so she flew over the rhine to the swampy woodside. This rhine, or large ditch, is one of many which intersect our moorlands for drainage purposes; it is about eight feet across from bank to bank, and was fairly well filled with water. With wings drooping and a little extended she moved fussily about, but not so excitedly as she had done when disturbed by us, and then a chick appeared upon her back; the chick had hopped there. Then, with something of a mixture between a hop and a fly, she safely conveyed the chick across to the meadow side which we had just walked up. She returned six more times, and each time conveyed a chick safely over in exactly the same way. To the bird-watcher an obvious query is, How did such young chicks understand from the old bird that they were to jump upon her back? I can understand the latter half of the brood doing exactly as they had seen the others do, but were the first chicks to cross over conscious of what they were about? Did they know what the old female expected them to do? I have noticed with the domestic fowl when brooding that a chick now and then misunderstands the parent's motive, and instead of going under her wing hops upon her back; we can hardly apply this explanation in the case of the young Pheasants, for with them there seemed to be

no misunderstanding; they did just what the old bird wanted them to do, and she was fully conscious that for their very existence, either for food or to escape danger, they were to cross the ditch.—STANLEY LEWIS (Wells, Somerset).

Leach's Petrel in Worcestershire.—On September 19th, 1914, Mr. T. E. Doeg, of Evesham, sent me an example of Leach's Petrel (*Oceanodroma leucorrhoa*), which had been picked up dead in a field near that town the same morning. Mr. H. E. Forrest records one ('British Birds,' vol. viii. p. 198) caught alive near Shrewsbury on the previous day, which subsequently escaped, flying off *down* the river; it might not improbably have reached Evesham by the following day and be identical with the one I have.—THOMAS GROUND (Moseley, Birmingham).

Sense of Direction in Birds.—Dr. Dewar's paper on "The Sense of Direction" brings us "no forader." How does he explain the performance of the young Cuckoo, which, deserted by its parents in England, is yet capable of following the old birds to their winter quarters in Africa? It never made the voyage before, and its parents, which have left the country weeks, sometimes months, previously cannot act as guides. The Polynesian Cuckoo, inhabiting the Kermadec Islands, makes two voyages of nearly one thousand miles each, annually, to New Zealand over the enormous waste of waters in the Pacific, for the purpose of breeding. How do the young find their way back over the ocean? Can Dr. Dewar suggest any solution of this problem?—RICHARD M. BARRINGTON (Fassaroe, Bray).

Curious Nesting-places of the Mistle-Thrush; Distribution of Thrushes in Winter.—Referring to the 'Transactions of the Paisley Naturalists' Society,' a notice of which appears in the 'Zoologist' (*ante*, p. 79), a curious nesting-site is recorded of the Mistle-Thrush, *viz.* on the tops of tombstones. This reminds me of another curious nesting-place of this species which Mr. Forrest, author of the 'Birds of Shropshire,' along with my son Rosse and others, found in a quarry on the slope of one of the mountains in North Wales. In Airedale this species scarcely ever builds its nest except in trees at altitudes varying from four to twenty feet, but in the neighbouring valley of the Wharfe I have twice found it built in stone walls, and in a district which was within easy distance of much more apparently natural nesting sites. Referring to the distribution of our indigenous Thrushes in the winter season, the Blackbird is by far the most persistent, similar to what obtains in the Paisley district, but the majority of these are male birds. The separation of the sexes,

however, is not so marked as in the case of Chaffinches. The question that naturally occurs to one's mind is, Are the Blackbirds that occur here in winter indigenous or immigrants? In all probability some are immigrants, as may be inferred from the fact that some striking varieties which have come here in autumn have left on the approach of the breeding season. In some winters—as, for instance, in the winter of 1879–80—the Song-Thrush is practically absent from this district.—E. P. Butterfield (Wilsden).

Starling and Sparrow in Captivity.—Miss Twyman's interesting notes on the Swift, &c., referred to by the Editor (p. 40), remind me of some experience I had with a Starling and a Sparrow kept in captivity. The Starling I obtained from a barrow-man, who was ill-using it, by pulling its long tongue to show its capacity for talking like a Parrot. Having got it home, I put it into a cage, where it soon made itself at home. A few days after, I saw our Cat with a recently caught Sparrow, which I was able to rescue and put into a cage, which I placed within a yard or two of the Starling's. Though not ideal cage-birds, they were model neighbours to each other, and I found them quite interesting. The Starling became very tame and sociable. If it found the cage-door open while I was having a meal, it would get on my shoulder and ask for some of it. The end of my two pets was rather pathetic. One morning I found the Starling dead in its cage, and next morning the Sparrow was dead. I had them a little over a year.—J. Rose (Binstead, Isle of Wight).

The Meaning of "Katones."—On reading Mr. Aplin's note (*ante*, p. 68) quoting from 'William of Worcester,' it occurred to me that "Katones" might be a corruption of, or have some connection with, the Spanish word "Patines." This word ("Patines") was in use as a name for the Manx Shearwater in Ray's time, two hundred years ago, for he gives it as one of the names of this species in his 'Synopsis Avium,' 1713 (see Pennant, Brit. Zool., 1776, p. 465). The name also appears in the 'Dictionary of the Spanish Academy, Madrid,' 1822, as that of a bird "not uncommon on the northern coasts of Spain, which is black above and white below, with white marks on the wings and which feeds on fish, and flies and runs upon the surface of the water." A Shearwater, or Petrel, of some kind is pretty clearly indicated by this description, although the dictionary goes on to give as a Latin explanation, *Fulica atra*, which is obviously wrong. The sound of the word "Patines" might, I think, be mistaken for "Katones" by this author, who seems to have been

careless in such matters, or not very quick at differentiating sounds; he seems also to have got his information as to place-names by word of mouth, and would probably get his bird-names by the same means. If dictionaries are to be depended upon, though it must be allowed they are unsatisfactory sources of ornithological information, I should be disposed to think the word "Patin" as meaning Shearwater has now become obsolete, for in the new edition of Velasquez, 1912, it is applied to the Goosander, whereas the Spanish name for Shearwater is given as "Pico-tijera," the English equivalent of which (Scissor-bill) is usually applied to a *Rhynchops*. Mr. Dresser, in his 'Manual of Palæarctic Birds,' states that the Spanish name for the Manx Shearwater is "Animas, diablos," a misprint most likely for "Animas-diablos," which is, however, correctly printed in his 'Eggs of the Birds of Europe.'—THOMAS GROUND (Moseley, Birmingham).

IN Rodd's 'Birds of Cornwall,' the editor, Mr. J. E. Harting, quotes the passage cited by Mr. Aplin from the 'Itinerarium Wilhelmi Botoner,' which contains the mysterious reference to "Katones et muscæ, id est mowses," and suggests that "Katones" is a misreading for "Capones," *i. e.* Fowls. In 'The Gannet, a Bird with a History,' the same passage is again quoted (p. 315, *note*) with the suggestion that "Katones" should read "Ratones," *i. e.* Rats. A third rendering was put forward by my father, that the word was meant by Botoner to be "Catones," *i. e.* Cats. Considering the loose way in which Botoner kept his journal, all these explanations are possible, but the last seems to be the best, for if there were Mice on the island, a Cat or two might have been introduced from the mainland to keep them down.—J. H. GURNEY (Keswick Hall, Norwich).

A MISREADING, if any, would have been in the transcription of the MS. of the 'Itinerarium' when it was printed in 1778. It is possible that a mistake was made then. I quoted from Nasmith's edition, the only one I know. "Katones" and "Kahoues" look something alike, printed, as the Editor suggests. But whether they would look so much alike in a MS. of that date is another matter. The *sound* of the two words is quite different. "Cahow" is, I suppose, a name of Spanish-American or of West Indian origin, and I do not think it is in the least likely to have been in use in Wales in the fifteenth century. Possibly the author bungled the word, as he did when he made "Kermerertes" out of Cormorants, or something like it. But, even so, I cannot think what the name could really be. I might have said that the author mentions "Pophyns" in his account of the Scilly Islands.—O. V. APLIN (Bloxham).

Rose-coloured Starling in Bedfordshire.—An adult male Rose-coloured Starling (*Pastor roseus*) obtained in the above county has recently been examined by me. It was picked up dead in October, 1913, by some children between the villages of Ravensden and Thurleigh. It was eventually taken to a taxidermist in Bedford, by whom it was purchased. The only other county record that I am aware of is a young bird of the year, shot at Barton-in-the-Clay in August, 1855 (see also 'The Naturalist,' vol. 6, p. 20).—J. Steele Elliott (Dowles Manor, Shropshire).

REPTILIA.

Colour Variations in a Chameleon.—A North African Chameleon in my possession a short time ago underwent variation of colour, whether placed against materials or on plants. The colours shown were various shades of brown, black, and cream, and on one occasion pink. The resemblance was more successful in the dull colours than it was in the more brilliant ones. It did not seem that visual realization was necessary, for the changes also took place when the animal appeared to be asleep, or at any rate when his eyes were closed. He would go to sleep one colour and awake a totally different one, without any apparent effect other than in the skin.—(Miss) M. Callard (Dulwich).

BATRACHIA.

Colour Transitions amongst Batrachia.—In July of 1911 I found three Toads amongst the heather on the top of one of the hills in the Hog's Back. They were a good half-mile from the nearest water, and the heat was such that several heath fires had occurred, yet the creatures managed to survive and appeared in good condition. When captured, their skin was of a distinctly purple hue, blending well with the heather and the dull red of the whortleberry bushes. They were put in a box of dry brown leaves and kept in the dark until the following day, by which time they had assumed a less brilliant grey-brown colour. This colour continued with slight variation of tone during the remaining months I had them in captivity.—(Miss) M. Callard (Dulwich).

CRUSTACEA.

Planes minutus at Padstow.—On January 14th, 1915, at Padstow, Cornwall, a large male specimen of the Sargasso Crab (*Planes* (*Nautilograpsus*) *minutus*) was found alive on a baulk of timber

(covered with large barnacles), which was stranded on one of the beaches of the estuary of the River Camel, about a mile and a half from the sea. This Crab was identified at the Marine Biological Association of the United Kingdom at Plymouth, and will be placed in the Association's collection at that place. — A. St. George Sargeaunt (Exbury, Padstow).

OPHIUROIDEA.

Rate of Regeneration in a Brittlestar.—The Common Brittlestar (*Ophiothrix fragilis*) shown in the accompanying illustration was placed in an aquarium at the Horniman Museum on the night of October 19th, 1914. The Brittlestar had broken off the distal ends of each of its five arms shortly after capture on that day, but the animal was healthy, and the lost ends have been in great part re-

generated. At the time of taking the photograph (1.30 p.m. on February 19th, 1915, *i. e.* one hundred and twenty-two clear days after fracture) the regenerated portions were respectively 6, 5, 4, 7, and 6·5 mm. in length. The average length of the regenerated parts of the five arms on February 19th was therefore 5·7 mm. If 5·7 mm. in one hundred and twenty-two days could be assumed to be the average rate of regeneration in the arms of other individuals of *Ophiothrix fragilis*, then we may conclude the average rate in a year to be about 17 mm. There are six other Common Brittlestars in the aquarium, all of which are regenerating lost parts of their arms, but I am not quite sure of the dates on which the arms were broken, and I cannot therefore calculate the rate of regeneration.—H. N. Milligan.

NOTICES OF NEW BOOKS.

The Fauna of British India. Mollusca.—II. (*Trochomorphidæ–Janellidæ*). By G. K. Gude, F.Z.S. London, 1914. Taylor & Francis.

In the present volume of the Molluscan section of the 'Fauna of British India' the high standard of that unrivalled publication is maintained, both in get-up and matter, while the illustrations are numerous. Although, of course, the book is mainly of interest only to specialist students of Mollusca, and in particular to those concerned with the Land Gastropoda, several facts of general bionomical interest come to light therein.

Notable is the fact that in the genus *Corilla*, of the *Helicidæ*, the barrier-armature of the mouth of the shells of the young is invariably different from that of the adult Snails, and especially that in *C. adamsi* such armature is confined to the young, the adult dispensing with this armature altogether.

Such a case is curiously paralleled by that of the Madagascar mammal, the Tenrec (*Centetes ecaudatus*), which is spiny when young, and merely bristly when adult. Another curious parallel between mammals and Snails occurs in the distribution of two Indian forms. Mr. Gude comments on the curious fact that a Snail of the genus *Vallonia* (*V. miserrima*) occurs in the Anamulley Hills in Southern India, though the genus is a typically northern one, and none of the other Indian species occur south of the Punjab. Now, among the Goats, typically northern animals, we find that of the two Indian species of the genus *Hemitragus*, one, the so-called Nilgiri Ibex, is confined to Southern India, far to the south of the haunts of its relative, the Tahr (*H. jemlaicus*), a well-known Himalayan animal. As the specimens of *Vallonia* were collected by Colonel Beddome before any European had visited the locality where he obtained them, the possibility of artificial introduction, so potent a factor in the distribution of land Mollusca, is excluded.